UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
New England Regional Laboratory
Office of Environmental Measurement and Evaluation
11 Technology Drive, North Chelmsford, MA 01863

Report Memorandum

Date: 12/6/17

Subject: Stack Emission Testing Observations – SMM

From: William Osbahr, Stack Testing Coordinator (EIA)

Through: Jerry Keefe, Team Leader (EIA)

To: Christine Sansevero, Senior Enforcement Coordinator Inspector (OES)

Facility Information

A. Facility Name: Sims Metal Management

B. Facility Location: 15-17 Green Earth Drive Johnston, RI 02919

C. Facility Contact: Joseph Caruso, Operations Manager

D. ICIS-Air #: RI0000004400740070

Background Information

A. Date of inspection: 9/6/17, 9/15/17, 9/18/17, 9/20/17

B. US EPA Representative(s): William Osbahr, Abdi Mohamoud, (9/6, 9/15, 9/18, 9/20), Christine Sansevero (9/6, 9/15, 9/18) Nicholas Bobbs (9/6, 9/15), Steve Rapp (9/6, 9/15), Tom Olivier (9/6, 9/15)

C. Federally Enforceable Requirements Investigated:

- Rhode Island Regulation 9

Attendees

Scott Jacobs	SMM	Regional Safety Director
John Sartori	SMM	General Manager
Brian Sackett	SMM	National Shredder Director
Rich Trzupek	Trinity Consultants	
Kristine Davies	Trinity Consultants	
Jon Schaefer	Robinson & Cole	
William Ansell	CAE	Stack Test Lead
Eric Doak	CAE	Sample Recovery Tech
Colleen Merringer	CAE	Sample Train Tech
Christian Young	CAE	Sample Train Tech

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Test Observation Notes

The purpose of the visit was to observe potential to emit testing that EPA ordered to conduct. SMM operates a 7000 hp metal shredder to recover metal from scrap light iron and automobiles. EPA is requiring SMM to test emissions from this shredder to quantify emissions of VOC and other pollutants.

During the September 6, 2017 pre-test visit, Rich Trzupek agreed to supply the following for the emissions test:

1. A sketch of the enclosure and its Natural Draft Openings (NDOs) with dimensions;
2. A table including NDO to Enclosure Area Ratio (NEAR) calculation;
3. Hot wire anemometer monitoring data for all NDOs or assorted openings in the enclosure;
4. Enclosure fan amperage recording data;
5. Cyclonic flows; and
6. Change in Pressure (Delta P) monitoring of the enclosure pressure vs ambient pressure.

Sketch and Dimensions of the Enclosure

On September 14, 2017, Mr. Osbahr was informed by Mr. Bill Ansell, Clean Air Engineering (CAE) project manager that a full sketch of the enclosure had not been completed. He informed Mr. Osbahr that several enclosure and NDO dimensions were still not accurately measured and NEAR calculations were not fully and properly confirmed. For example, Mr. Ansell stated that for an entry slot on the east side of the enclosure he only was "informed by SMM" that the approximate dimensions were 7' by 2'. Accordingly, he used these approximate dimensions in his "draft" calculation spreadsheet. Mr. Osbahr stated that SMM and/or CAE would need to provide a full sketch after proper measurements were documented.[1]

No Hot Wire Anemometer

Also, on September 14, 2017, Mr Osbahr was informed by Mr. Trzupek and Mr. Ansell that no Hot Wire Anemometer (HWA) was onsite for the emissions test. Mr. Ansell stated that CAE had not planned to actually measure face velocity at the NDO locations for this test effort. Mr. Osbahr informed both Mr. Ansell and Mr. Trzupek that this had been discussed during the pre-test visit and that EPA, SMM, and Trinity had agreed to this approach. In addition, Mr. Osbahr reminded Mr. Ansell and Mr. Trzupek that the need for a HWA at this event was again discussed when the three had spoken on the phone after the pre-test meeting.

Mr. Ansell stated that he would use a Shortridge analyzer to measure the Delta P of the enclosure. He stated that he could use it as a velocity measurement device at some of the enclosure locations. Mr. Osbahr explained that while the Shortridge has the capability to measure velocities, it does not measure SMM's NDO faces as well as a HWA would. Mr. Osbahr stated that it would not be as effective or versatile as an HWA for enclosure review. A HWA has an articulating and telescoping head, which is needed for measuring such a large enclosure. In addition, Mr. Osbahr stated that the Shortridge would not be able to measure face velocities of the NDO on the east side of the enclosure. That location was inaccessible. Due to the large size of this NDO, it is critical to verify velocity and direction of flow. The Shortridge would not be an effective tool for this analysis.

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[1] Note that to date, EPA does not have a copy of this sketch with enclosure measurements.

Mr. Osbahr noted that the east side NDO would not be able to be viewed directly during the emissions test from the test platform and trailer area. Mr. Osbahr was informed that the east end NDO was approximately 2' by 7'. Mr. Osbahr noted that this critical NDO could not be evaluated with an air flow velocity device or visually from the test platform during the actual test. Without properly demonstrating velocities, there would be the potential for the East end NDO emissions to go undetected.

On September 14, 2017 Mr. Ansell performed a few face velocity measurements on cracks in the enclosure curtains. The Shortridge read 220-460 fpm. These measurements were only on the west and south west corner of the enclosure flaps which were easily accessible. Shortridge velocity readings were taken at the bottom of the west end of the enclosure in the area where SMM had extended their flap covers down a few inches lower since tightening up the enclosure. Shortridge readings were taken at a few of the vertical cracks that exist between the gaps of the hanging enclosure flaps. Full access to other locations was not available. The Shortridge analyzer used by Mr. Ansell was not versatile enough to access other gap locations. This resulted in a very limited enclosure verification prior to the emissions test. This is contrary to what had been proposed by SMM and Trinity during the September 6, 2017, pre-test meeting, as well at the subsequent conference call.

On the first day of testing, Mr. Rapp, Ms. Sansevero, and Mr. Mohamoud were on site to observe the testing. They observed the testing from the operator's shed on the conveyor side of the shredder building. From there, they were able to see opacity coming from the East end NDO. Mr. Bobbs was able to take FLIR video as well. However, EPA is not able to quantify these emissions.

Broken Glass Nozzles for Method 5/29 Sample Train

On September 15, 2017, at 12:55, during Run #2, stack technician Mr. Christian Young removed the sample probe after the first half of the 60-minute sample run. He completed a leak check to verify integrity of the sample train. At that point, it passed leak check requirements under the standard and was witnessed by Mr. Osbahr. When moving the probe to the other sample port, Mr. Young accidentally hit the glass nozzle tip into the stack flange and it shattered. Mr. Osbahr allowed the stack test team to immediately replace the broken nozzle with one of the same size (Nozzle diameter was .200 in diameter). After passing a pre run leak check, testing resumed. The sample train passed the post run leak check. The lack of recovery of the nozzle from the first half of the run could bias the PM and Metals result lower.

After the run was completed, Mr. Osbahr observed that the second .200 in dia nozzle had chips and nicks in it. Mr. Osbahr required CAE to change out this nozzle. CAE consequently needed to switch to a .210 in diameter series nozzle set. Isokinetics were not adversely effected as demonstrated later in the test series.

On September 18, 2017, at the end of Run #4, CAE technicians removed the Method 5/29 sample train and again plunged the glass nozzle into the outside flange breaking the nozzle. Mr. Osbahr allowed the leak check to be performed from the glass liner back through the impingers. The remaining sample train passed the leak check requirements. Again, in this instance, the effect of such event could bias the Metals and PM emissions collection lower due to lost sample matter not recovered in the nozzle.

On September 20, 2017, during Run #6, CAE failed the final leak check for the Method 5/29 sample train. This called in to question the metals and PM data that were collected during that run. However, the T015 and Method 25A data from Run #6 were acceptable. Mr. Osbahr contacted Ms. Sansevero and Mr. Rapp by cell phone. They agreed that, given the leak check failure, EPA would reject the run for Metals and PM and it would not be included in the 3 run average. Mr. Osbahr informed SMM, Trinity, and CAE representatives of this decision.

Air Bag Canister Combusting on the Ground

On September 15, Mr. Osbahr witnessed SMM employee use a water cannon to extinguish a burning air bag canister on the ground near the final shredded metal stock area.

Enclosure Exhaust Stack Plume

Throughout the 3 days of testing Mr. Osbahr notice frequent high steam and particulate laden streams emanating from the stack exhaust. Mr. Osbahr took photographic videos camera of emissions emanating from the enclosure during assorted runs. Mr. Bobbs took FLIR videos. Both sets of videos and all photos will be retained on the EPA Q Drive under Air Enforcement Secure Photo/Video File section.

Enclosure Exhaust Outlet Screen Status

On the afternoon of September 18, 2017, Mr. Osbahr was informed by CAE technicians that an exhaust screen at the outlet of the enclosure blower motor had been removed by SMM prior to that day's testing. Mr. Osbahr questioned Mr. Joseph Caruso, operating manager regarding the screen removal. Mr. Caruso stated that Trinity or CAE had informed SMM that flows had dropped down after a period of time on September 15, 2017. SMM made a decision on September 16, 2017, over the weekend, to remove the screen. This would avoid any flow restriction due to a clogged screen. Mr. Osbahr reviewed draft CAE data for flow runs and saw that the flow had dropped off from the pretest flow rates as listed below. Flow rates likely dropped off as a result of PM collecting on the screen, which would cause a restriction. Note that fan amperage was recorded throughout the 3 days of testing and amperage was reasonably steady. See approximate flow in table below:

Date	Run	Flow Rate (ACFM)[2]
9/14/17	Prelim	13.7
9/15/17	1	13.3
9/15/17	2	11.75
9/16/17	******	Exhaust screen taken out on Saturday 9/16/17
9/18/17	4	14.1
9/18/17	4	14.8

Delta Pressure issues in enclosure

On September 15, 2017, at the start of the test, Mr. Osbahr informed Mr. Trzupek and the CAE crew of Mr. Ansell, Mr. Young and Ms. Colleen Merringer that throughout the test they should pay close

[2] Draft data for reference only.

attention to the enclosure Delta P. Mr. Osbahr explained that any changes in Delta P in the enclosure could be an indication of lost capture efficiency, ineffective enclosure operations, fan problems or possible pressure monitoring issues.

On September 20, 2017, at 9:03 am, just five minutes into the start of Run #5, Mr. Osbahr noted an extremely low Delta P reading from the Shortridge analyzer. Readings were fluctuating from low to positive Delta P. Mr. Osbahr immediately requested CAE halt the run and determine if there were issues with the enclosure or the monitor. SMM and CAE performed diagnosis on the pressure line leading from the enclosure. That line appeared to be clogged inside the enclosure. A repair was made to the line. The clogged portion of the ¼ line was cut out of the system. As a precaution, a Nalgene bottle shroud with multiple ¼ in holes in it was installed over the Delta P sample inlet location. It was installed to protect the inlet from future particulate matter contamination and possible condensate clogging due to the constant presence of steam. Test run #5 resumed at 11:10 am. Note, that the total time for Run #5 consists of the first 5 minutes from 8:58 am through 9:03 am (prior to the Delta P issue) plus the run times from 11:10 through 3:33 pm.

As Run #5 continued, Mr. Osbahr noted fluctuations in the Delta P. Testing occurred during a strong rainy northeast wind, due to the effects of Tropical storm Jose off the coast of RI. Mr. Osbahr noted that wind fluctuations caused the flexible enclosure panels to waft in and out. Such conditions cause an increase area of NDO's that exist at the bottom of the flaps as well as gaps between the flaps. Increase in NDO gaps cause a decrease in Delta P and can reduce overall capture efficiency for the NDO. This can result in an increase in emissions from all NDO locations of the enclosure.

PM/Metals Sampling Observations

At the end of the first run, before performing train leak checks, Mr. Young removed particulate matter from the external PM/Metals sample nozzle tip area. He did so immediately after he removed the sample from the port, before allowing proper discussion with EPA on the matter. There was a substantial amount of fabric fibers and other particulate matter that had accumulated at the nozzle tip during the sampling run. He did not recover this portion of the sample for analysis. It is unclear as to whether the material removed from the nozzle should be included in the sample catch analysis. Some of the external catch could be clogged outside the nozzle break plane, while some of the clog could have been inside the nozzle break plane. It was not possible to determine with accuracy how much PM/Metals were contained in the clog discarded by CAE. It is also not possible to determine how much more PM/Metals would have reached the sample catch if the nozzle had not been covered with the discarded fibrous material during the run. The accumulation of fibrous material could serve as an external filter at the nozzle entrance point. This might impede the ability of some PM/Metals to be captured and included in the overall emissions calculation. This fibrous material is characteristic of this high PM sample stream. The duct for the enclosure was an extremely moist and high PM laden stream. The screen exhaust screen clogging issue mentioned in this document are further evidence of the extreme amount of PM seen during the enclosure operations.

For all subsequent runs, to keep consistency, Mr. Osbahr allowed the removal of the external clog of material in each run. It should be noted that this could result in a lower bias in the overall PM/Metals emissions results for the test period. Mr. Osbahr discussed the impact that the discarded clog of PM/Metals might have on emissions estimates at the closing interview with SMM and Trinity. Mr. Trzupek stated that the PM/Metals results could likely have been much higher in the captured stream due to the enclosure capturing and conveying PM/Metals that would normally have left the shredder area and settled on the ground of the SMM property. Mr. Osbahr stated that the discarding of the sample clog could result in a low PM/Metals bias.

It is also important to note that SMM has no particulate controls for this captured stream. SMM does not have a scrubber, cyclone, filter baghouse or any other sort of PM control on the duct leaving the enclosure. This was an atypically wet, steam laden, particulate laden sample stream that had no prior emissions measurements performed.

At the start of PM/Metals testing, Mr. Osbahr informed the complete crew of CAE that they should watch any gradual or immediate changes in their vacuum pressures of the sampling train to be aware of plugging in the sample lines or even the flow pitot tubes. Vacuum readings during the test runs did not indicate sample line restrictions that would be cause for stopping any of the sampling runs. However, that does not quantify or diminish in any way the effect of the discarded clog that existed at the end of each run.

Flow Measurement

As mentioned in this document, the SMM sample stream is extremely wet and steam laden. During the sample runs Mr. Osbahr recommended that CAE use compressed air to blow out the pitot tubes frequently during the run to keep the pitot lines clear and allow for accurate readings. SMM ran a compressed air line up to the stack platform. Ms. Merringer was able to continually blow out the pitot lines with compressed air. Throughout the test, no pitot leak checks failed during QA checks at the end of the runs.